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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,080	09/25/2003	Tan-Jen Chen	2003B095	6291

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EXAMINER	
SINGH, PREM C	
ART UNIT	**PAPER NUMBER**
1764	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/671,080	CHEN ET AL.	
	Examiner	Art Unit	
	Prem C. Singh	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/12/2006 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 51 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: polymerizing or co-polymerizing propylene as claimed in claim 51.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 19-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ladwig et al (US Patent 6,093,867) in view of Swan III et al (US 2001/0042700 A1).

8. With Respect to claim 19, Ladwig discloses a process for selectively producing C3 olefins from a catalytically cracked or thermally cracked naphtha stream. Ladwig also discloses, " Medium pore size zeolites that can be used in the practice of the present invention include MFI, MFS, MEL, MTW, EUO, MTT, HEU, FER, and TON which include ZSM-5, ... Other suitable medium pore size zeolites include SAPO-4 and SAPO-11." (See column 4, lines 8-27). Ladwig further adds, "The catalyst may be ZSM-5 or other small or medium pore zeolites." (Column 6, lines 61-62).

Ladwig does not disclose using a multicomponent catalyst.

Swan discloses a process for converting naphtha and cycle oils produced in catalytic cracking reactions into light olefins. Swan further discloses, "The catalyst may comprise one or more individual catalyst particles and other reactive and non-reactive components. More than one type of catalyst particle may be present in the catalyst. For example, individual catalyst particles may contain large pore zeolite, shape-selective zeolite, and mixtures thereof." (Page 3, paragraph 0023). Swan adds, "Further increase in propylene production can be obtained when a shape selective catalyst is combined with large pore FCC catalyst, as shown in column 3." (Page 6, paragraph 0055).

Since Ladwig and Swan both inventions teach production of light olefins from naphtha, using similar catalysts, under similar operating conditions, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig

invention and use a multicomponent catalyst as disclosed by Swan to increase the olefin production in the resulting product.

9. With respect to claim 20, Ladwig discloses the feed naphtha with a boiling range of 65-430°F (18-221°C) (See column 3, lines 1-3).

10. With respect to claim 21, Ladwig discloses, "The medium pore size zeolites generally have pore size from about 5-7A°." (Column 4, lines 11-13).

11. With respect to claims 22-24 and 33-35, Ladwig invention does not specifically mention first and second molecular sieves and the difference in pore size index of the two molecular sieves.

Ladwig invention does not explicitly disclose that the molecular sieves have one-dimensional non-interconnecting and three dimensional interconnecting channels.

Ladwig invention discloses the method to determine the pore size of the molecular sieves, but does not specifically mention individual pore size index of at least one channel of say, ZSM-5, (which the applicant selects as the first molecular sieve) and say, SAPO-11 (which the applicant selects as the second molecular sieve). Since the pore size index of these standard molecular sieves is an inherent property, it would have been obvious to determine the pore size indices of the two molecular sieves and claim that the pore size index of the second molecular sieve is less than that of the first molecular sieve. Since Ladwig invention uses the same type of molecular sieves as

claimed by the applicant, they must have one-dimensional non-interconnecting and three-dimensional interconnecting channels.

12. With respect to claims 25-29 and 37-41, Ladwig invention discloses that the molecular sieves include for example, MFI, MFS, MEI, MTW, EUO, MTT, HEU, FER, and TON structure type zeolites. Non-limiting examples of such medium pore size zeolites include ZSM-5, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-38, ZSM-48, ZSM-50, silicalite, and silicalite 2 (See column 4, lines 11-18). Other suitable medium pore size zeolites include the silicoaluminophosphates (SAPO) such as SAPO-4 and SAPO-11, ALPO-11, TASO-45, TAPO-11 (See column 4, lines 25-33).

13. With respect to claim 30, Ladwig discloses, "Feed streams are those streams boiling in the naphtha range and containing from about 5 to 35 wt% paraffins, and from 15 to 75 wt% olefins." (Column 2, lines 60-66). "The naphtha can be a thermally cracked or catalytically cracked naphtha." (Column 3, lines 3-4).

14. With respect to claim 31, Ladwig discloses a hydrocarbon residence time of 1 to 10 seconds (See column 2, lines 31-32). Ladwig further adds, "The preferred process conditions include temperatures from 500 to 650°C, hydrocarbon partial pressure from 10 to 40 psia, and catalyst to naphtha (wt/wt) ratio from about 3 to 12, where catalyst weight is total weight of the catalyst composite." (Column 4, lines 64-67; column 5, lines 1-3).

15. With respect to claim 32, Ladwig does not disclose using a large pore zeolite and feed hydrocarbon with IBP of 200°C.

Swan discloses using a large pore zeolite as discussed under claim 19. Swan also discloses using a feedstock comprising hydrocarbon mixture with initial boiling point of 220°C (See page 2, paragraph 13).

Although Swan is using a feedstock with an initial boiling point (IBP) of 220°C, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig invention as discussed under claim 19 by substituting the multicomponent catalyst of Swan invention and use a hydrocarbon feed with IBP of 200°C and produce more of light components.

16. With respect to claims 36 and 42, Ladwig does not disclose using large-pore zeolites as claimed.

Swan discloses large pore zeolites with pore diameter more than 0.7 nm as zeolite Y and mixtures of zeolite Y and beta (See page 3, paragraph 0026 and 0027). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Ladwig invention as discussed under claim 19 by substituting large pore zeolites as disclosed in Swan invention. Since the catalysts disclosed by Swan are large-pore zeolites, any zeolite with pore size more than 0.7 nm, including the claimed zeolites, is expected to effectively convert naphtha to light olefins. See *In re Ruff, 256 F.2d 590, 118 USPQ 340 (CCPA 1958)* and also see *In re Fout, 675 F.2d 297, 213 USPQ 532 (CCPA 1982)*.

17. With respect to claims 43, 44, and 48, Ladwig does not disclose third molecular sieve.

Swan discloses using zeolite Y and mixture of Y and beta as the third molecular sieve (See page 3, paragraph 0026 and 0027). Thus, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig invention and use large pore zeolite Y as suggested by Swan for an improved propylene yield.

18. With respect to claim 45, Ladwig does not disclose using a hydrocarbon mixture with IBP above 200°C.

Swan uses hydrocarbon oils boiling in the range of 220-565°C (See page 2, paragraph 0013).

Although Swan does not specifically mention the 50% point of the hydrocarbon oil, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig invention as discussed under claim 19 by using a hydrocarbon oil in the boiling range as disclosed by Swan and also specify its 50% point for its proper characterization as a feed for light olefin production.

19. With respect to claim 46, Ladwig does not disclose using hydrocarbon oils as claimed.

Swan discloses using, "Gas oils, heavy hydrocarbonaceous oils comprising materials boiling above 565°C, heavy and reduced petroleum crude oil, petroleum atmospheric distillation bottoms, petroleum vacuum distillation bottoms, pitch, asphalt,

bitumen, other hydrocarbon residues, tar sand oils, shale oil, liquid products derived from coal liquefaction processes, and mixtures thereof." (Page 2, paragraph 0013). Thus, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig invention and use the feed stocks as suggested by Swan for a wider selection of feeds and increased production of propylene.

20. With respect to claim 47, Ladwig does not disclose the weight ratio of third molecular sieve to the first and second molecular sieves.

Swan discloses, "The zeolite portion of the catalyst particle will typically contain from about 5 to 95 wt % zeolite Y and the balance being ZSM-5." (Page 3, paragraph 0028). Thus, it would have been obvious to one skilled in the art at he time the invention was made to modify Ladwig invention and use a ratio of the third molecular sieve to the first and second molecular sieves in a range, including the claimed range, for a high selectivity and activity for propylene production

21. With respect to claims 49 and 50, Ladwig discloses, " At least about 60 wt% of the C_5+ olefins in the naphtha stream are converted to C_4- products and less than about 25 wt% of the paraffins are converted to C_4- products and the propylene comprises at least about 90 mole% of the total C_3 reaction products with the weight ratio of propylene/total C_2- products greater than about 3.5. It is also preferred that ethylene comprises at least 90 mole% of the C_2 products with the weight ratio of propylene: ethylene being greater than about 4." (Column 5, lines 8-16 and 48-49).

22. With respect to claim 51, Ladwig discloses, "In addition, a low cost supply of light olefins, particularly propylene, continues to be in demand to serve as feedstock for polyolefin particularly polypropylene production." (Column 1, lines 31-34).

Ladwig does not specifically mention about separation of propylene.

Swan discloses, "There is an increased demand for FCC products containing increased concentration of light olefins that may be separated for use in polymerization." (Page 1, paragraph 0003). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Ladwig invention and separate propylene from the FCC process and polymerize to produce polypropylene.

Response to Arguments

23. The Applicant argues that Ladwig fails to teach a two-component catalyst for propylene production. The rejection relies on several segments of Ladwig including certain excerpts from column 4 but the rejection does not rely on Ladwig at column 4, lines 36-46. Column 4, lines 36-46 of Ladwig is the exact evidence to show that Ladwig does not teach a two component catalytic cracking catalyst as claimed. Ladwig goes out of his way to teach precisely that certain of his inventive catalyst can be "crystalline admixtures", not to be confused with physical admixtures. How would the skilled artisan know which combination of catalysts to choose to obtain better propylene production ? Ladwig is of no help.

The Applicant's argument is not persuasive because although Ladwig does not use a two-component catalyst, Swan does use a two-component catalyst, as discussed above under claim 19.

24. The Applicant argues that since Ladwig specifically mentions, but does not teach or suggest, the physical admixtures of zeolites in the very next sentence, why did not he go on to include them in his invention? Of course, he did not and one can surmise that this skilled artisan (Ladwig) could not have contemplated that a lower-producing zeolite could ever improve on the propylene production of the superior ZSM-5 of his invention. That would have been counterintuitive. It is counterintuitive and this surprising effect of the present inventive process is the genius and unobviousness of the present invention.

The Applicant's argument is not persuasive because Swan has used a two/three component catalyst for improved propylene production (See page 6, paragraph 0055; page 3, paragraph 0023).

25. The Applicant argues that the Examiner also referred to Swan for teachings of for use of multiple catalysts but Swan does not teach the present inventive process and Swan relies on either zeolite Y (a large pore zeolite) alone or in conjunction with another zeolite. The claimed invention is not taught or suggested. See Swan at page 3, the fifth line of paragraph [0024], and paragraphs [0028-0029] wherein zeolite Y plus SAPOs or other catalysts, are taught. These do not meet the present claims.

The Applicant's argument is not persuasive because Swan teaches, "Individual catalyst particles may contain large pore zeolite, shape-selective zeolite, and mixtures thereof." (Page 3, paragraph 0023). Swan further discloses that shape-selective zeolites include ZSM-5 and SAPO-11 (See page 3, paragraph 0029 and 0030). Thus, Swan clearly teaches use of a large pore zeolite, ZSM-5, and SAPO-11. This exactly is the Applicant's claimed invention.

26. The Applicant argues that even if one argues that a prima facie combination of catalyst components is shown (a showing not agreed by the Applicants), then any such case is overcome by the surprising results of the process of the invention.

The Applicant's argument is not persuasive because Swan clearly teaches, "Further increase in propylene production can be obtained when a shape selective catalyst is combined with large pore FCC catalyst, as shown in column 3." (Page 6, paragraph 0055).

27. The Applicant argues that Purvis is recited for a disclosure of polymerizing recovered propylene but the claimed invention is still not shown. The defined process using two different catalyst components for cracking and propylene recovery is not taught or suggested. Since different catalyst systems tend to leave different trace components in the polymer particles, this claim is deemed novel and unobvious over other recovery and polymerization combinations.

It is to be noted that claim 51 is rejected on 35 USC §112, Second paragraph, for failing in showing the required steps for polymerization and co-polymerization. Also it is to be noted that the rejection is not based on Purvis. Both Ladwig and Swan inventions suggest using propylene for polypropylene production (See claim 51 above in the Office action).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PS/021507

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